

U.S. Serial No. 09/462,845

REMARKS

In Response to the Restriction Requirement of September 27, 2001, Applicant elected the Claims in Group I with traverse. Also, in this Response mailed December 18, 2001, Applicant cancelled Claims 12-16 and added new Claims 17-21, in order to correct a numbering error in the application as originally filed. As Applicant indicated in the Response to the Restriction Requirement, there was no Claim 12 in the application as originally filed (*i.e.*, the application was originally filed with Claims 1-11, and 13-16). Thus, Applicant submits that by canceling Claims 12-16 and adding Claims 17-21, Applicant was in compliance with 37 C.F.R. 1.126, as the original numbering of the Claims was preserved and the new Claims added in the Response to the Restriction Requirement began with the next consecutive number (*i.e.*, Claim 17). Thus, Applicant respectfully submits that the Claims as filed and indicated in the Response to the Restriction Requirement were correct. Thus, Claims 1-7, 9-11 and 17-21 were pending. However, as the Examiner reiterated the Claim numbering objection, Applicant amended Claims 17-21 to Claims 16-19. Thus, Claims 1-7, 9-11 and 16-19 were pending. In a Response filed November 26, 2002, Applicant cancelled Claims 2 and 18 without prejudice. Thus, the pending Claims are 1, 3-7, 9-11, 16-17, and 19.

Applicant appreciates the Examiner's withdrawal of the previous rejections and objections. Applicant herein addresses the Examiner's rejections in the following order:

- 1) Claims 1, 4-7, 11 and 16 stand rejected under 35 U.S.C. §102(e), as allegedly being anticipated by Murphy *et al.* (U.S. Patent No. 5,877,001); and
- 2) Claims 1, 3-7, 9-11, 16-17, and 19 remain rejected under 35 U.S.C. §112, first paragraph, as allegedly not meeting the written description requirement; and
- 3) Claims 1, 3-7, 9-11, 16-17, and 19 remain rejected under 35 U.S.C. §112, first paragraph, as allegedly not meeting the enablement requirement.

1) The Claims are Novel Over Murphy *et al.*

The Examiner has rejected Claims 1, 4-7, 11 and 16, under 35 U.S.C. §102(e), as allegedly being anticipated by Murphy *et al.* (US Patent No. 5,877,001). The Examiner argues that Murphy *et al.* "teach a *Bacillus* microorganism having a mutation

U.S. Serial No. 09/462,845

or deletion of part of the gene encoding SP1 (Columns 15-22), resulting in a polypeptide with inactivated SP1 activity." (Office Action, page 2). Applicants must respectfully disagree. Murphy *et al.* teach the production and sequence of an amidase obtained from the archaeobacterial genus *Thermococcus*. Unlike the presently claimed invention, there is absolutely NO teaching in Murphy *et al.* of a *Bacillus* having a mutation or deletion of part or all of the gene encoding serine protease 1 (SP1), wherein said gene encoding serine protease 1 comprises SEQ ID NO:1, said mutation or deletion resulting in the inactivation of the SP1 proteolytic activity. Rather, Murphy *et al.* briefly discuss the use of *Bacillus* as a recombinant host cell for production of their thermostable *Thermococcus* amidase. Furthermore, the sequences claimed in the presently claimed invention are different from those of Murphy *et al.* As Murphy *et al.* do NOT teach the presently claimed *Bacillus* species, Applicant respectfully submits that the presently claimed invention is novel over the teaching of Murphy *et al.*¹ As the requirements of anticipation are not met, Applicant respectfully requests that this rejection be withdrawn and the Claims be passed to allowance.

2) The Written Description Requirement is Met

The Examiner has maintained the rejection of Claims 1, 3-7, 9-11, 16-17 and 19 under 35 U.S.C. §112, first paragraph, as allegedly not meeting the written description requirement. Applicants must respectfully disagree.

The Examiner argues that "[t]he specification does not contain any disclosure of the structure and function of all mutant SP1 genes resulting from mutation or deletion of part or all of the SP1 gene. The genus of DNA that comprise these above mutant and portions of SEQ ID NO:1 is a large variable genus with the potentiality of encoding many different proteins The specification fails to describe any other representative species by any identifying characteristics or properties other than the 'functionality' of encoding a polypeptide with an inactivated SP1 proteolytic activity and fails to provide any structure: function correlation present in all members of the claimed genus Therefore, one of ordinary skill would require guidance in order to make gram-positive

¹ "Anticipation is established only when a single prior art reference discloses, expressly or under principles of inherency, each and every element of a claimed invention." *RCA Corp. v. applied Digital Data Sys., Inc.*, 730 F.2d 1440, 221 USPQ 385, 388 (Fed. Cir. 1984).

U.S. Serial No. 09/462,845

microorganisms having a mutation or deletion of part of [sic] all of the gene encoding SP1 (SEQ ID NO:1), wherein resulting mutation or deletion results in the inactivation of the SP1 proteolytic activity in a manner reasonable [sic] correlated with the scope of the claims." (Office Action, page 3-5, emphasis original). Applicant must respectfully disagree. However, Applicant notes that the Examiner admits that Applicant's assertions that the Specification teaches how to determine the activity of mutant SP1 enzymes.

Indeed, as indicated previously, Applicant must respectfully disagree with the Examiner's argument and rationale, as the present Specification teaches how to produce mutated SP1 (serine protease 1) (See e.g., pages 8-9 of the Specification), as well as how to determine whether the mutated SP1 falls within the Claims (See e.g., pages 5-7 of the Specification), and methods for detecting homologues of *B. subtilis* SP1 (and other serine proteases) (See e.g., pages 5-7 of the Specification), and methods for determining protease activity (See e.g., pages 12-13 of the Specification). Applicant respectfully submits that both the structure and function of the mutant SP1s claimed are provided in the Specification, as the amino acid sequence (base structure) and function (protease activity) are well-described throughout the Specification.

Contrary to the Examiner's arguments, Applicant is NOT required to describe in detail each and every embodiment of the presently claimed invention. Indeed, description of a representative number of species does not require that the Applicant describe each and every species. As indicated in MPEP §2163(II)(A)(3)(a)(ii), "[s]atisfactory disclosure of a 'representative number' depends on whether one of skill in the art would recognize that the applicant was in possession of the necessary common attributes or features of the elements possessed by the members of the genus in view of the species disclosed. For inventions in an unpredictable art, adequate written description of a genus which embraces widely variant species cannot be achieved by disclosing only one species within the genus. See, e.g., *Eli Lilly*. Description of a representative number of species does not require the description to be of such specificity that it would provide individual support for each species that the genus embraces."

Applicant respectfully submits that the representative number of species disclosed in the present application is more than sufficient to inform those of skill in the enzyme art that Applicant was in possession of the claimed invention, namely,

U.S. Serial No. 09/462,845

organisms within the genus *Bacillus* having a mutation or deletion of part or all of the gene encoding serine protease 1 (SP1), wherein the gene encoding serine protease 1 comprises SEQ ID NO:1, wherein the mutation or deletion results in the inactivation of the SP1 proteolytic activity, at the time of filing. Thus, unlike the situation in *Eli Lilly*, in which proteins from two widely different species of animals were involved, the presently pending claims are directed to mutant SP1 proteins from *Bacillus*. Applicant respectfully submits that the teachings regarding the sequence of SP1 (SEQ ID NO:1), as well as the teachings of methods to determine SP1 activity, etc., are more than sufficient to support Applicant's possession of the genus of mutant *Bacillus* SP1s. Thus, Applicant respectfully requests that this rejection be withdrawn.

3) The Claims are Enabled

The Examiner has rejected Claims 1, 3-7, 9-11, 16-17, and 19, as allegedly being non-enabled. Applicant must respectfully disagree. The Examiner argues that "... the specification does not reasonably provide enablement for gram-positive microorganism[s] having any mutation or deletion of part of [sic] all of SEQ ID NO:1 resulting in a mutant gene that inactivates SP1 proteolytic activity." (Office Action, page 4, *emphasis original*). Applicant must respectfully disagree with the Examiner's argument and characterization of the pending Claims. The Claims pending as of entry of the amendments filed on November 26, 2002, clearly recite that the organisms are members of the genus *Bacillus*, not Gram-positive microorganisms in general. Applicant respectfully submit that as the Examiner admits, the Specification as filed teaches how to determine the activity of mutant SP1 enzymes. Further, at pages 8-9, the Specification teaches how such mutations and deletions may be made. In addition, the Specification indicates that the S9 protease group, to which the present SP1 belongs contain a catalytic residue triad "Ser-Asp-His" and conserved amino acids around them. " Furthermore, as indicated above, Applicant provides information regarding the function of the SP1, and indicates the structure associated with the enzyme's catalytic activity. Thus, Applicant submits that there is more than sufficient support in the Specification for the Claims. Furthermore, in a previous Office Action mailed January 3, 2002, the Examiner admits that the Specification is "enabling for the nucleic acid encoding serine protease of SEQ ID NO:1" (page 4).

U.S. Serial No. 09/462,845

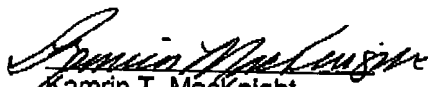
Thus, Applicant respectfully submits that the present Specification, which teaches the production of mutations or deletions that result in the inactivation of SP1 proteolytic activity in members of the genus *Bacillus* enables the presently pending Claims. As Applicant has provided information regarding the SP1 sequence, the sequence of the catalytic triad, the source of the organism, methods for determining proteolytic activity of mutant enzymes, and other information regarding the claimed invention, Applicant respectfully submits that the Claims are enabled. Thus, Applicant submits that the Claims are allowable and respectfully requests that they be passed to allowance.

CONCLUSION

All grounds of rejection in the Office Action of February 11, 2003, having been addressed, reconsideration of the application is respectfully requested. Should the Examiner believe that a telephone interview would aid in the prosecution of this application, Applicant encourages the Examiner to call the undersigned.

Respectfully submitted,

Dated: 7 May 2003


Kamrin T. MacKnight
Registration No. 38,230

Genencor International, Inc.
925 Page Mill Road
Palo Alto, CA 94304-1013
Phone: (650) 846-5838
Facsimile: (650) 846-6504